PROGRAM FOR ARTERIAL SYSTEM SYNCHRONIZATION (PASS)

Program Guidelines for
2011/12 Cycle of Projects

January, 2011

METROPOLITAN
TRANSPORTATION
COMMISSION

Metropolitan Transportation Commission
Joseph P. Bort Metro Center
101 Eighth Street
Oakland CA 94612-3500
http://www.mtc.ca.gov/services/arterial_operations/

TABLE OF CONTENTS

1 Introduction

The purpose of the Program for Arterial System Synchronization (PASS) is to provide technical and financial assistance to Bay Area agencies to help improve the safe and efficient operation of certain traffic signal systems and corridors. The Transportation 2035 Plan provides approximately $1.25 million per year in CMAQ funds for traffic signal coordination under PASS. MTC will administer and manage this program, but the primary responsibility for the operation and retiming of traffic signals resides with the agency that owns them. Projects are defined by local agencies, evaluated by MTC staff, and assigned to consultants retained by MTC.

Under this regional program, technical assistance and financial support will be focused on traffic signal system projects that:

1. Interact with freeways and state highways;
2. Involve traffic signals from multiple jurisdictions;
3. Operate on corridors with established regional significance;
4. Provide priority for transit vehicles; and
5. Have been developed in conjunction with other regional programs.

1.1 Goals and Objectives

The goals and objectives of the PASS are as follows:

1. Establish and maintain communications between systems owned by Caltrans and local agencies. This could entail provision of GPS units, signal interconnect cable, or other technology to enable two-way communication and coordination, as well as retiming the signals once the new communications system is activated.
2. Coordinate local and state-owned signal systems, and retime signal systems in response to changes to the state-owned system. This would include changes resulting from freeway widening, reconfiguration of interchanges or intersections, implementation of ramp metering, or altering the lane configuration on state highways.
3. Retime traffic signal systems to support priority for transit vehicles. This would include active priority through signal preemption systems and passive priority through signal timing plans, and could include providing transit vehicles with rapid access/egress from major transit hubs.
4. Retime traffic signal systems in conjunction with other established regional programs, such as Safe Routes to Schools, Safe Routes to Transit, Complete Streets, SMART corridors, and Incident Management.

Typical tasks performed under the PASS to meet the above goals and objectives include, but are not limited to, the following:

1. Improve reliability and predictability of travel along arterial roads.

- Develop and implement signal coordination plans (a.m., p.m., and/or midday) that reduce travel time and delay on corridors that contain state and local signals.
- Collect peak period turning movement counts at all study intersections, including pedestrian and bicycle counts, and seven-day 24-hour machine counts at strategic locations to determine periods of coordination.
- Develop and implement signal coordination plans based on the throughput of people rather than vehicles.
- Develop and implement flush plans for arterials that are used as diversion routes in the event of freeway incidents, in conjunction with other incident management actions.
- Develop and implement optimized actuated settings for fully actuated signals to minimize queuing during non-peak periods.

2. Improve air quality through decreased motor vehicle emissions and fuel consumption.
   - Develop and implement signal coordination plans that reduce starts and stops and promote uniform travel speeds.
   - Develop and implement transit signal priority plans to make transit a more attractive travel option.
3. Improve the safety of motorists, pedestrians, and bicyclists.
   - Collect pedestrian and bicyclist volume data at the same time as vehicle count data at intersections to be coordinated.
   - Develop and implement signal coordination plans that promote uniform travel speeds, thereby reducing rear-end collisions.
   - Review existing pedestrian crossing times and bicycle detection at intersections to be coordinated, and recommend adjustments as necessary.
   - Review collision history for patterns that are susceptible to correction through signal timing and recommend adjustments as necessary.
4. Provide streamlined program administration and project management.
   - Provide high-quality technical assistance in a cost-effective manner.
   - Require local agency review and approval of timing plans prior to implementation.
   - Provide a peer review option to small agencies that do not have in-house traffic engineering staff.
   - Use data on the quality of the deliverables and the number of projects completed within schedule and budget to guide assignment of projects to consultants in subsequent cycles.
   - Facilitate interagency communication and coordination.

2 Eligibility

The applicant for PASS funds must be a Bay Area public agency, and must either be an owner of the traffic signal system addressed in the application, or authorized to act on behalf of multiple agencies (e.g., a smart corridor) that own the traffic signal system(s) addressed in the application. For an applicant to apply on behalf of other agencies, the applicant must have the other agencies sign the application or submit letters of support for the proposed project that authorize the applicant to apply on their behalf. Applicants for projects that involve Caltrans traffic signals do not need to submit letters of support or signatures from Caltrans since these applications will be reviewed by MTC and Caltrans after submission. Project sponsors are required, however, to notify the appropriate Caltrans traffic operations staff about their PASS application if it includes Caltrans signals. If any additional information is needed from Caltrans to complete the

application, the project sponsor must coordinate with Caltrans at least two weeks in advance of the application submittal deadline.

All agencies that are involved in a project must also satisfy the following requirements:
1. Indemnify MTC by signing an indemnification agreement **before** any work on the project begins;
2. Provide staff time to review and approve project deliverables as per the schedule;
3. Provide staff to install any GPS clocks required for the project at Caltrans signals†;
4. Provide staff time to assist consultants with implementing timing plans; and
5. Commit to completing the project within one year of the award date.

† *The only exception to this is if Caltrans is willing to install the clocks for the project.*

2.1 Eligible Projects

To be eligible for PASS funds, a project must entail retiming traffic signal systems, consistent with the purposes set forth in Section 1 of the program guidelines. As part of the application, the project sponsor must demonstrate how the proposed project meets the goals and objectives described in Section 1. There is no maximum funding for a project. While there is no maximum number of projects that may be submitted for consideration, it is unlikely that more than two projects will be awarded to the same project sponsor in a year.

Traffic signal retiming projects must involve a minimum of eight signalized intersections with interconnection or reliable time sources, and are currently capable of coordinated operation, unless the project application requests funding for establishing communication. Improvements to communication systems are eligible, but limited to a maximum of $10,000 per project. Capital improvements funded with PASS federal funds will be limited to communication systems, and will be capped at $10,000 per project. MTC, at its sole discretion, may approve more funds for this task for the successful completion of any particular project.

MTC will procure all of the GPS clocks required for the project. Due to Caltrans resource constraints, any GPS clocks required for the project will need to be installed by the local agencies at the Caltrans signals. The Caltrans traffic operations staff will be present during the installation to configure the clocks. MTC will provide consultant assistance to local agencies to apply for a Caltrans permit to install these clocks. MTC will be actively involved to coordinate this task with all stakeholders. The clocks will be owned by the agency that owns the traffic signal. MTC will also provide spare GPS clocks to Caltrans that can be used to replace any malfunctioning clocks so as to keep the corridor in coordination.

As mentioned in Section 1, high priority will be given to those projects that interact with freeways and state highways and involve traffic signals from multiple jurisdictions.

Projects that involve traffic signals owned by one local agency are considered to have low priority for PASS funding, unless they are part of a regional program, such as Safe Routes to Schools, Safe Routes to Transit, Complete Streets, SMART corridors, and Incident Management. Projects that satisfy the requirements in Section 1, but request only weekend timing plans, have low priority for PASS funding, unless the traffic volumes are equal to or above the weekday peak period volumes. The project sponsor must provide adequate documentation in the application to establish the need for weekend coordination in these corridors.

2.2 Ineligible Projects

Projects that involve traffic signals that have been coordinated within the past three years are ineligible, unless a change to the state-owned portion of the system, as described on page 1 of these Guidelines has occurred.

Projects that involve development of traffic signal coordination plans for future traffic volumes are also ineligible.

3 Project Selection Process

3.1 Call for Projects

The Call for Projects occurs once per year in the spring using a standardized application form. The new application released with the corresponding year's Call for Projects must be submitted to be considered for funding for that current cycle. Applications from prior or for future cycles will not be reviewed or approved. Applicants are given approximately one (1) month for preparation of the application. All applications for eligible projects received by the deadline shown in the application form will be evaluated by MTC and Caltrans staff. Applications received after the deadline will be returned unopened to the project sponsor without exceptions.

Complete applications that clearly demonstrate how the proposed project meets the goals and objectives described in Section 1 will be given high priority for PASS funding. Projects that do not receive funding immediately will be placed on eligibility list, in case one or more approved projects can not be pursued. Unsuccessful project sponsors are encouraged to re-apply in subsequent cycles of the program to receive funding. New applications must be submitted for consideration since applications from prior cycles/years will not be considered or reviewed.

3.2 Waiver of Claims and Indemnification

Receipt of a PASS grant is contingent on the local agency's willingness to enter into an agreement with MTC to: (1) waive any and all claims against MTC for any loss liability or damages resulting from this program (directly or indirectly); and (2) indemnify, hold harmless, and defend MTC against any and all third party claims that may result from the agency's participation in the program. This agreement has to be executed by the person authorized to enter into agreements with MTC. An agency that requires peer review assistance will also be required to sign such an agreement in favor of the peer reviewer. When the Call for Projects is issued, the electronic version of this agreement will be available for download along with the project application from the MTC website at: http://www.mtc.ca.gov/funding/ or applicants may contact the MTC Project Manager directly.

It is strongly recommended, but not required, that the indemnification agreements be submitted to MTC along with the application. All agencies (sponsor and participants) are encouraged to review this agreement with their attorneys to obtain approval before submitting an application. It is strongly recommended that the local agency start the indemnification agreement approval

process as soon the application is filed in the spring, thus providing themselves with sufficient time to submit a signed agreement by the project commencement in the summer. The waiver and indemnification agreement must be on file with the MTC project manager within thirty (30) days of notification that the agency has been selected for participation in the program.

Please note that the MTC Project Manager is required to have this completed form on file **before** any work on the project can begin. If this agreement is not submitted, MTC, at it sole discretion, reserves the right to allocate these funds to other projects from the eligibility list.

3.3 Application

The Call for Projects outlines the detailed requirements and deadlines for submitting the project applications. The sponsoring agency is required to submit five hard copies of the completed application, including all supporting materials, and a PDF copy (in a CD Rom) to the MTC Project Manager. Faxed or Emailed applications will not be accepted or considered. When the Call for Projects is issued, the electronic version of the project application will be available for download from the MTC website at: http://www.mtc.ca.gov/funding/ or applicants may contact the MTC Project Manager directly.

MTC does not require applicants to furnish proof of permission to apply or to provide the local match. It is the responsibility of each applicant to ensure all local funding and approval requirements are met. For an applicant to apply on behalf of other agencies, the applicant must have the other agencies sign the application or submit letters of support for the proposed project that authorize the applicant to apply on their behalf. Applicants for projects that involve Caltrans traffic signals do not need to submit letters of support or signatures from Caltrans since these applications will be reviewed by MTC and Caltrans after submission. Project sponsors are required, however, to notify the appropriate Caltrans Traffic Operations staff about their PASS application if it includes Caltrans signals.

3.4 Administrative Responsibility

MTC will administer and manage this program. Projects are defined by local agencies, evaluated by MTC and Caltrans staff, and assigned to consultants retained by MTC. Projects will be evaluated based upon how well the proposed project meets the goals and objectives described in Section 1. MTC will obligate federal funds through Caltrans; serve as the recipient of the federal funds; contract with consultants; approve consultant deliverables; and pay consultant invoices. Consultants are paid directly by MTC using a deliverable-based schedule as discussed in detail in Section 5: Scope of Work, Schedule and Budget.

3.5 Project Selection and Grant Award

The eligible projects are evaluated by MTC and Caltrans, to determine projects with high-priority for funding under PASS. Successful project applicants will be informed after the approval by the MTC Operations Committee. Grants are awarded in the form of Consultant

assistance, and MTC directly pays the Consultant at the successful completion of each project deliverable. To maximize the use of available funds for signal coordination, local agency staff costs are not typically reimbursed in part or full under PASS. However, MTC understands some projects with a large number of signals require a significant amount of local agency staff time, and thus the funding of this task is solely at the discretion of MTC.

3.6 Consultant Assignment

It is MTC's intention to assign projects to consultants during the first cycle based on equity and interview performance. Consultant project assignments during the second year of the contract will reflect their performance during the prior year and the project sponsor preferences. Sponsors will be given an opportunity to indicate their consultant preferences in the application during these subsequent program cycles. Efforts will be made to assign consultants based on project sponsor preferences as indicated in the applications, but it is possible that the assigned consultant may not be the sponsor's first preference. MTC will work closely with all of the consultants and stakeholders to ensure the project is successfully completed as per the PASS guidelines. MTC will seek feedback from all participating agencies and consultants to make changes/enhancements to the program at the end of every cycle.

3.7 Project Delivery

The assigned consultant contacts the project sponsor, other stakeholders, and MTC to schedule the kick-off meeting for the project. The kick-off meeting provides an opportunity to establish communication channels and protocols; discuss the scope of work, schedule, and budget; gather available information; and discuss the sponsor's goals and signal timing practices with the consultant.

All necessary technical correspondence occurs between the project sponsor, other stakeholders, and the consultant. MTC is copied on all technical correspondence. The role of MTC is to ensure that high quality, timely, and within-budget technical assistance is provided for the agreed upon scope of work. Any changes to the scope of work agreed upon at the kick-off meeting are subject to MTC approval and require a revised Workscope, Schedule and Budget.

All agencies that own or operate traffic signals within the project limits, as well as MTC, are required to review consultant deliverables in a timely fashion. MTC's review of deliverables focuses on adherence to the approved scope of work. Consultants are paid for each deliverable by MTC after both the project sponsor and MTC have approved the deliverable and all comments have been addressed. The consultant will directly invoice MTC for all the deliverables completed in the calendar month.

The consultant has to allocate sufficient time for all the agencies involved to review and comment on the deliverable. Deliverable review time is set during the kick-off meeting. At the completion of each deliverable the consultant has to submit a 'Comment Response Sheet' incorporating the comments received from all agencies and the actions taken to address the comments. Any changes to the agreed upon schedule are subject to MTC approval.

4 Consultants

4.1 Selection

The consultants for the PASS are selected through a Request for Qualifications (RFQ). A panel consisting of staff from MTC and Caltrans will evaluate the Statement of Qualifications (SOQ) and conduct interviews, if necessary. The length of the consultant contracts are for one cycle of the program with the option to renew for 2 more cycles at the sole discretion of MTC. This will help to evaluate consultants' performance during the first cycle of the program and allow MTC to make necessary changes accordingly. MTC retains two to four consultants selected after the RFQ process to provide technical assistance for projects under the program.

4.2 Qualifications

All PASS consultants have the following qualifications:

1. Lead staff with applied knowledge of, and expertise in:
   a. the principles of traffic signal timing and signal coordination;
   b. hardware and software used for traffic signal systems;
   c. analysis of recent collision history for susceptibility to correction through traffic signal timing and coordination; and,
   d. accommodating the needs of all users of arterials, including motorists, pedestrians, bicyclists, transit patrons, and transit vehicles in the context of traffic signal timing and coordination.
2. Lead and technical staff with experience in:
   a. the use of micro-simulation software for optimization of arterial signal coordination;
   b. implementation of timing plans using legacy and modern traffic signal system software and hardware; and,
   c. operation and programming of different types of controllers.
3. Lead staff with eight (8) or more years of experience in the areas of expertise noted above and California Civil or Traffic Engineer registration; and technical staff with three (3) or more years of experience in the areas of expertise noted above.

4.3 Evaluation

At the conclusion of each project, project sponsors are required to fill out and return to MTC a confidential consultant evaluation form. MTC will develop an online performance survey to conduct this evaluation. MTC uses the results of the evaluation to determine the number of projects that are assigned to the consultant in the subsequent years of the consultant contract and as a reference for future evaluations. This evaluation also helps MTC to make necessary changes or improvements to the program in subsequent cycles.

4.4 Indemnification of MTC and Client Jurisdictions

Consultant shall indemnify and hold harmless MTC, Caltrans and Client Jurisdictions, their commissioners, directors, officers, agents, and employees from any and all claims, demands, suits, loss, damages, injury, and/or liability (including any and all costs and expenses in connection therewith), incurred by reason of any negligent or otherwise wrongful act or omission of Consultant, its officers, agents, employees and subcontractors, or any of them, under or in connection with the contract; and consultant agrees at its own cost, expense and risk to defend any and all claims, actions, suits, or other legal proceedings brought or instituted against MTC, Caltrans or Client Jurisdictions, their commissioners, directors, officers, agents, and employees, or any of them, arising out of such negligent or otherwise wrongful act or omission, and to pay and satisfy any resulting judgments.

The indemnification obligation shall not apply to liability arising from and caused by the adjudicated or admitted negligence or willful misconduct of MTC or any of the Client Jurisdictions. If the adjudicated or admitted negligence or willful misconduct of MTC or any of the Client Jurisdictions contributes to a loss, consultant shall not be obligated to indemnify such indenmitee for the proportionate share of such loss caused by such negligence or willful misconduct.

4.5 Insurance Requirements

Consultants are required to maintain insurance coverage during the term of the contract with MTC, to the limits as specified in the contract. MTC, Caltrans and Client Jurisdictions, their commissioners, directors, officers, representatives, agents, and employees are to be named as additional insureds. Such insurance as afforded by this endorsement shall be primary as respects any claims, losses or liability arising directly or indirectly from consultant's operations.

4.6 Ownership of Work Products

Computer files and models generated from signal timing analysis software packages including, but not limited to, Synchro and SimTraffic, and detailed signal timing sheets shall be the property of the Client Jurisdiction that owns the traffic signal for which the project work was prepared or assembled, and copies shall be delivered to the Client Jurisdiction promptly upon completion of the work or upon an earlier termination of the project. Consultant hereby assigns to MTC and the Client Jurisdiction ownership of all right, title, copyright and interest for all models, analyses, and reports completed as part of this project.

5 Scope of Work, Schedule and Budget

5.1 Scope of Work

The services to be performed by Consultant will consist of services requested by the MTC Project Manager or a designated representative including, but not limited to, the following:

0. Program Kick-Off

At the beginning of each annual cycle, Consultant will meet with the MTC Project Manager and other PASS consultants to discuss Program guidelines and standardization of services, deliverable formats, and project administration. Electronic files shall be named in accordance with a naming convention specified by the MTC Project Manager.

1. Project Start-Up

1.1 Project Kick-Off Meeting – Consultant will schedule a meeting with the project sponsor, other involved agencies, and the MTC Project Manager or designated representative to kick-off the project; establish communication channels and protocols; discuss the scope of work, schedule, and budget; gather available information; and obtain a thorough understanding of the goals of the project. Specific topics to discuss include the turning movement data collection and times to collect travel time data.

1.2 Consultant will assist the local agencies with preparing the application for the Caltrans permit for the installation of the GPS clocks, if requested at the kick-off meeting. Consultant will also make any edits to the application upon feedback from Caltrans permit staff. This task will be considered an additional service and the approx. level of effort shall be included in the WSB.

1.3 Preparation of a Workscope, Schedule, and Budget – Consultant will prepare a detailed Workscope, Schedule, and Budget (WSB) for review and approval by the project sponsor, other involved agencies, and the MTC Project Manager. Consultant will finalize the WSB based on comments received from the project sponsor, other involved agencies, and the MTC Project Manager. This deliverable is invoiced after the approval of the Final WSB.

Deliverable 1A:	Draft Workscope, Schedule, and Budget
Deliverable 1B:	Final Workscope, Schedule, and Budget

2. Analysis of Existing Conditions

Consultant will collect and analyze all information necessary to thoroughly understand existing traffic conditions in the study area and be able to develop optimal time-of-day traffic signal coordination plans and transit signal priority plans, if applicable.

2.1 Data Collection – Consultant will collect existing conditions data including, but not limited to, the following:

2.1.1. From the project sponsor and other involved agencies, Consultant will collect existing timing sheets, existing coordination plans, traffic signal as-built drawings, aerial photos, maps, and collision diagrams for the study intersections, if available.

2.1.2. From the project sponsor and other involved agencies, including transit properties, if any, Consultant will collect signal timing and signal priority preferences, including, but not limited to, those related to pedestrian and bicycle timing, leading and lagging left-turn phasing, and conditional service, as well as the timing optimization software preference.

2.1.3. Consultant will conduct peak period turning movement counts at all study intersections, including pedestrian and bicycle counts, and seven-day 24-hour machine counts at strategic locations to determine periods of coordination. All counts shall be taken during times and days that are representative of the times and days for which coordination plans will be developed. It is preferred that all counts be summarized in MS Excel format or in the format of the project sponsor's preference. It is preferred that Video Data Collection be used for this task as it helps with the validation of the data. Other data collection methods shall be considered based on the preference of the project sponsor or if video data collection is not feasible.

2.1.4. Consultant will conduct a field review of all study intersections and street segments to verify lane geometry, speed limits, storage lengths, signal phasing, distances between intersections, and crosswalk lengths, unless the information is available through other sources such as aerial photos and speed surveys. Consultant will conduct a field review at key intersections to measure queue lengths and saturation flows for heavy movements.

2.1.5. Consultant will conduct a field review to observe typical traffic patterns during the weekday peak periods for which coordination plans will be developed. Consultant will note factors that are expected to affect signal progression including, but not limited to: intersections with high pedestrian or bicyclist volumes; over-saturated intersections; uneven lane distribution; high volumes of trucks and buses; high-volume unsignalized intersections, including interchanges; parking maneuvers; and presence and location of bus stops.

2.1.6. Consultant will verify signal coordination and transit priority capabilities of existing equipment and communications infrastructure. Consultant will take digital photos of the controller cabinet and the contents of the controller cabinet, unless waived by the system owner. The digital photos may be taken during timing plan implementation, at the discretion of the Consultant.

2.1.7. Consultant will conduct travel time and delay studies, including number of stops, during times and days that are representative of the times and days for which coordination plans will be developed. A minimum of four runs shall be conducted for each direction for each peak period. Travel time and delay studies shall be conducted using the floating car method. The time of performance of the travel time and delay studies will be defined at the kick-off meeting.

2.2 Analysis of Existing Conditions – Consultant will analyze the data obtained from Task 2.1 as follows:

2.2.1 As permitted by the project stakeholders, Consultant will review initial and actuated settings for each study intersection to identify opportunities to minimize delay during non-coordination periods and enhance pedestrian and bicyclist safety. The analysis shall include, but not be limited to, review of minimum and maximum green settings; yellow and red times; pedestrian timing; and gap, extension, and reduction settings.

2.2.2 Consultant will review collision diagrams for the study intersections, if available, to identify patterns that are susceptible to correction through signal timing.

2.2.3 Using software specified by the project sponsor, Consultant will develop a model of the study area and calibrate the model based on field observations of existing conditions. Signal coordination optimization software may include, but not be limited to, Synchro, TRANSYT 7-F, or PASSER. Transit signal priority modeling software may include, but not be limited to, VISSIM or Paramics. Consultant will calibrate the model based on travel time and delay studies and field observations of queue lengths and saturation flows for heavy movements at key intersections.

2.2.4 Consultant will summarize the results of the existing conditions analyses in an Existing Conditions Technical Memorandum. At a minimum, the Memo will include: description of the roadway network and surrounding land uses, including a map showing the study intersections; description of traffic volumes, including day-to-day variability and directionality; description of traffic signal controllers and communication capabilities; identification of factors that are expected to affect progression; results of analysis of initial and actuated settings; description of collision patterns that may be susceptible to correction through signal timing; measures of effectiveness, including delay, number of stops, and travel time from the travel time and delay studies, and fuel consumption and emissions using a methodology specified by MTC; and model calibration results, including a summary of changes to the optimization software's default values. Consultant may be required to meet with the project sponsor and other involved agencies to present and discuss the results of the Memo. Consultant will finalize the Memo based on comments received from the project sponsor, other involved agencies, and the MTC Project Manager.

Deliverable 2A:	Draft Existing Conditions Report, including computer model with existing timings
Deliverable 2B:	Final Existing Conditions Report, including computer model with existing timings

3. Development of Recommendations

Consultant will develop recommendations of optimal initial and actuated settings; time-of-day coordination plans and hours of coordinated operation; and transit signal priority plans and hours of operation, if applicable. Development of optimal time-of-day coordination plans shall include analyses of signal grouping; phasing and phase sequence, including conditional service*;* cycle lengths, splits, and offsets. Consultant will summarize recommendations in a Recommendations Technical Memorandum. The Memo shall also include a comparison of existing and proposed timings and a description of expected improvements. Consultant will finalize the Memo based on

comments received from the project sponsor, other involved agencies, and the MTC Project Manager.

Deliverable 3A:	Draft Recommendations Report, including computer model with recommended timings
Deliverable 3B:	Final Recommendations Report, including computer model with recommended timings

4. Implementation and Evaluation

Consultant will implement and evaluate the approved improvements as follows:

4.1 Consultant will prepare for review and approval by the project sponsor and other involved agencies appropriate timing sheets based on the approved timing plans. Consultant will revise the timing sheets based on comments received from the project sponsor and other involved agencies.

4.2 Consultant will assist with the preparation and approval of the Caltrans permit for projects involving installation of GPS clocks at Caltrans signals. MTC will procure all the GPS clocks required for the project. The GPS clocks will be installed by the local agencies at Caltrans signals. The Caltrans traffic operations staff will be present during installation to configure the clocks. MTC will be actively involved to coordinate this task with all stakeholders.

4.3 Consultant will implement, or assist agency staff in the implementation of, the new settings and timings. Implementation may have to be done in the field or from a central location, depending upon communication capabilities and agency preferences.

4.4 Consultant will fine-tune, or assist agency staff in the fine-tuning of, the new settings and timings. Consultant will fine-tune timings in the field and record all changes. Fine-tuning shall be conducted during times and days that are representative of the times and days for which coordination plans were developed. This also requires additional field visits to verify and assess any changes made during the fine-tuning process.

4.5 Consultant will conduct travel time and delay studies, including number of stops, at the key corridors identified under Task 2.1.7. Travel time and delay studies shall be conducted during times and days that are representative of the times and days for which coordination plans were developed. A minimum of four runs shall be conducted for each direction for each peak period. Travel time and delay studies shall be conducted using the floating car method.

4.6 Consultant will provide to the MTC Project Manager electronic files of all traffic counts, and controller and cabinet information, in a file-naming convention specified by MTC.

4.7 Consultant will calculate measures of effectiveness of the improved system, including delay, number of stops, travel time, fuel consumption, emissions, benefit: cost, and cost effectiveness for emissions reductions. The methodology for calculating fuel

consumption, emissions, benefit: cost, and cost effectiveness for emissions reductions will be specified by MTC.

4.8 Consultant will also calculate the measures of effectiveness for transit achieved with the signal coordination for certain projects, as identified in the kick-off meetings. Only travel-time and speed will be evaluated as a part of this effort since fuel consumption and emissions reduction benefits are almost negligible with many transit agencies using zero-emission or hybrid vehicles. The Benefit-Cost analysis methodology will be developed by MTC to incorporate these benefits. The level of effort involved for this task is considered as an additional service and will be finalized with the WSB.

4.9 Consultant will prepare a Final Timings and Evaluation Technical Memorandum, which will include but not be limited to: the final periods of coordination; changes between the timings recommended under Task 3 and the final timings that were implemented; the number of locations where changes were made to better accommodate pedestrians and/or bicyclists; and the results of the evaluation of measures of effectiveness.

Deliverable 4A:	Implementation and Fine-tuning, including final timing sheets
Deliverable 4B:	Final Project Report with Benefit-cost Analysis, including the final computer model

5. Additional Services

In addition to the basic signal coordination, the scope of the PASS program includes providing additional services like incident management flush plans, transit signal priority plans, traffic responsive timing plans, weekend timing plans, additional timing plans, technical studies, feasibility studies, evaluation of transit benefits, etc. These services will be requested by the project sponsor in the application and will be included in the WSB, contingent on approval by MTC. Consultant may also be requested to perform these additional services for any projects retimed in the last two years under the RSTP or the PASS. Such services may increase the scope of the work to include additional meetings, additional data collection, field visits, technical analyses, studies, fine-tuning, conditional diagrams, updating Visio coversheets, etc.

Upon MTC approval, Consultant shall include a detailed description of the scope of work, a staffing plan, and a level of effort estimate in its WSB. The scope and budget of these services will be negotiated on a case-by-case basis. If these tasks cannot be reasonably negotiated, MTC, at its sole discretion, can withdraw the project assignment to the consultant and assign a different consultant to the project. The payment scheduled will be negotiated to compensate for the tasks completed and finalized in the WSB. Additional services may also be requested by Consultant after the WSB has been approved by requesting an amendment to the approved WSB. Any change to the scope or budget must be included in a revised WSB and sent to all project stakeholders.

6. Reduced Services

Consultant may be requested to perform only some of the services above in cases where some services are not part of the PASS project, are already available, or agency staff wishes to perform

them themselves. Should reduced services be requested, Consultant shall identify in its WSB which tasks will be performed by the Consultant and which will be performed by the agency. The fee for reduced services shall be a percentage of the base fee per intersection set forth in Section 5.3.1, that is commensurate with the proportion of services to be performed by Consultant. Deliverables will be negotiated on a case-by-case basis.

5.2 Schedule

	Task	Timeline for 2011/12 Cycle
0.	Call for Projects and Consultant RFQ/Amendments	March 2011
	Project Approval/Notification	June 2011
1.	Project Start-Up	
	Kick-Off Meetings	July 2011
	Workscope, Schedule, and Budget	August 2011
2.	Analysis of Existing Conditions	
	Data Collection	September 2011
	Analysis	October 2011
3.	Recommendations	January 2012
4.	Implementation and Evaluation	Implementation by March 2012; Final Project Report by May 2012

5.3 Budget

5.3.1 Signal Coordination

MTC will pay consultants on a fixed fee basis, based on the following fee schedule.

Service (Tasks 0 through 4)	# of Scenarios*	Amount Due
Time-of-day signal coordination with timings implemented remotely from intersection, e.g., via dial-up or from traffic management center	3	$2350 per intersection
	2	$2100 per intersection
Time-of-day signal coordination with timings implemented in the field	3	$2550 per intersection
	2	$2300 per intersection

* Scenario = morning, off-peak/midday, or afternoon peak periods

5.3.2 Additional Services

MTC recognizes that some projects may require additional analyses, or have approved additional services as identified in Item 5: Additional Services of Section 5.1: Scope of Work. The budget and payment schedule for these additional services is based on the level of effort to complete these tasks, and is negotiated before finalizing the WSB. If any of these cannot be reasonably negotiated, MTC, at its sole discretion, can withdraw the project assignment to the consultant and assign a different consultant to the project.

5.3.3 Payment Schedule

MTC will pay consultants by deliverable based tasks based on the following payment schedule. The Consultant will submit the invoices directly to MTC Accounting. MTC will approve the payment after both the project sponsor and the MTC Project Manager have approved the deliverable.

Task	Deliverables (#)	Payment
1.	Draft and Final Workscope, Schedule and Budget (#1A and #1B)	5% of Project Budget
2.	Draft Existing Conditions Report (#2A)	35% of Project Budget
	Final Existing Conditions Report (#2B)	10% of Project Budget
3.	Draft Recommendations Report (#3A)	15% of Project Budget
	Final Recommendations Report (#3B)	10% of Project Budget
4.	Implementation and Fine-tuning (#4A)	15% of Project Budget
	Final Project Report with Benefit-cost Analysis (#4B)	10% of Project Budget
5.	Additional Services	To Be Negotiated

-This page is left blank intentionally-